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WHAT ARE WE GOING TO DO WITH OUR HARDWOODS?

by

I. F. Eldredge, Regional Director,
Forest Survey of the South

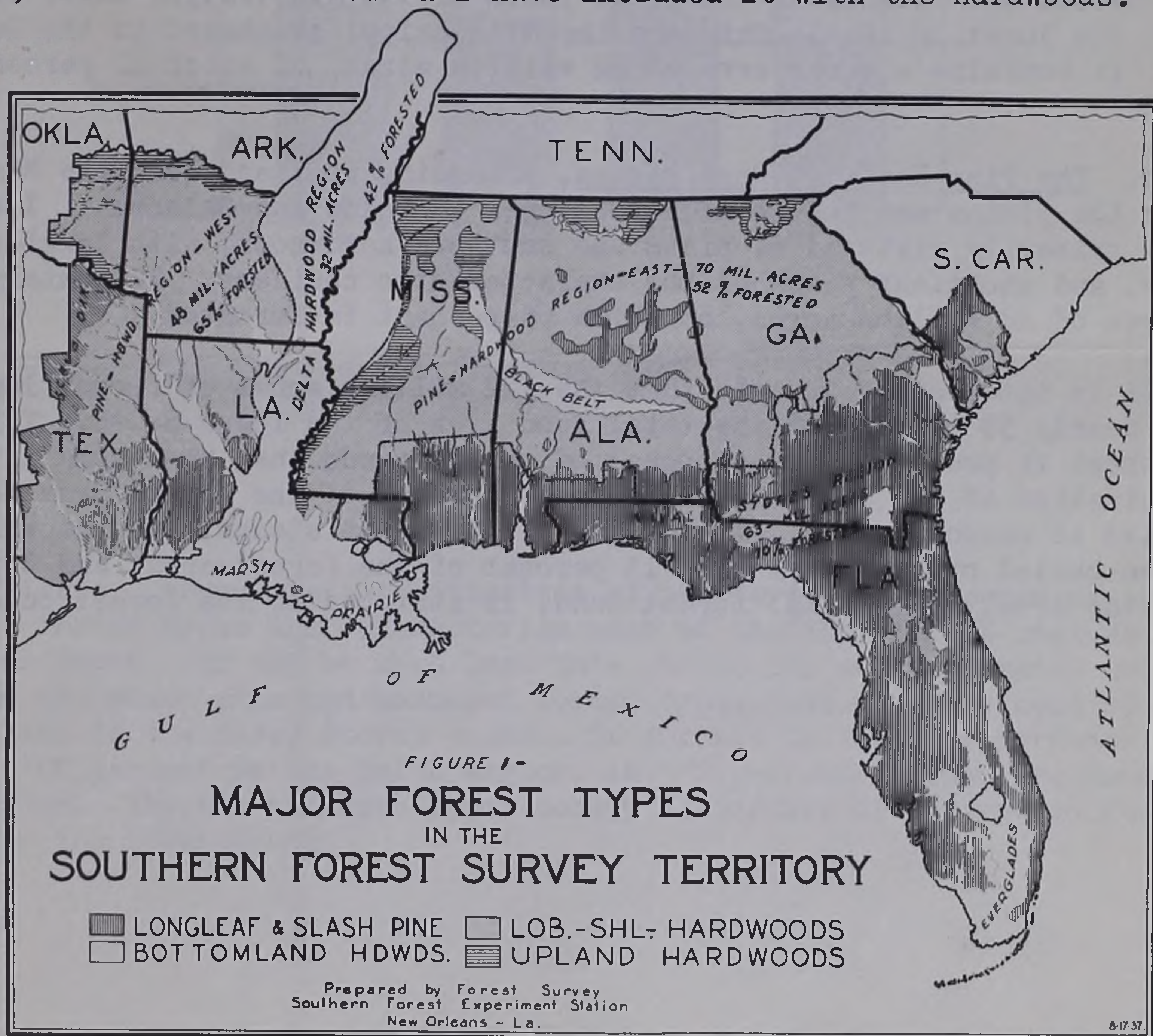
The Occasional Papers of the Southern Forest Experiment Station present information on current southern forestry problems under investigation at the Station. In some cases, these contributions were first presented as addresses to a limited group of people, and as "occasional papers" they can reach a much wider audience. In other cases, they are summaries of investigations prepared especially to give a report of the progress made in a particular field of research. In any case, the statements herein contained should be considered subject to correction or modification as further data are obtained.

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In discussions up until now of the South's forest resources, your attention has been directed frequently to the pines. To me, one of the most interesting facts developed by the Federal Forest Survey is that in both area and volume there is more hardwood timber in the lower South than there is pine. This is an unexpected finding. Most of us have been brought up to picture the lower South as a pine country—the home of the greatest pine forest in the world. The recent development of the kraft paper industry in the South has accentuated the emphasis on our pine forests, and even those of us who had a first-hand acquaintance with southern forests failed to realize the true situation. As a matter of fact, the Forest Survey found on the 122 million acres of forest land in the eight states of the lower South (fig. 1) that 51 percent of the area is occupied by hardwood forest types, either pure or mixed with pine, and that of the total volume of usable wood material, amounting to 1,449,000,000 cords, hardwood trees contain 63 percent. Strictly speaking, cypress is not a hardwood, but in this discussion I have included it with the hardwoods.



^{1/} Address presented before the Southern Pulp and Paper Club at the Paper Festival Savannah, Ga., April 18, 1939.

It is my purpose briefly to discuss the hardwood-supply situation and its significance in the development of forest industries in the lower South. First, let us look at a map showing the territory covered by the Forest Survey. As may be seen, it includes the entire area of Georgia, Florida, Alabama, Mississippi, and Louisiana, the commercial forest regions of Texas and Oklahoma, and about three-fourths of Arkansas. Small portions of the Mississippi delta in Missouri, Kentucky, and Tennessee are also included. For the purpose of exposition and discussion, the territory has been divided into four forest regions, as follows:

1. The Naval Stores Region, an area of 58 million acres lying along the South Atlantic and Gulf Coast, approximately 71 percent of which is forested. The characteristic forest species are longleaf and slash pines, but many other species of both pines and hardwoods are associated with them.

2. The Pine-Hardwood-East Region, lying east of the bluffs of the Mississippi delta country and north of the naval stores belt. This region which contains 70 million acres of land surface and is 52 percent forested, is a pine-hardwood country, with loblolly and shortleaf pine as the characteristic conifers in admixture with southern hardwoods.

3. The Delta Region, which supports an almost pure stand of bottom-land hardwoods and extends in the flood plain of the Mississippi River from Cairo at the junction of the Ohio and the Mississippi southward to the Gulf of Mexico. It contains a gross area of 32 million acres, of which 42 percent is forested.

4. The Pine-Hardwood-West Region, extending westward from the Mississippi delta to the plains and the scrub oak forests of Texas and Oklahoma. Its forests are primarily mixtures of pines and southern hardwoods, with longleaf, loblolly, and shortleaf pines as the characteristic conifers. It contains a gross area of 48 million acres, of which 65 percent is forested.

It is interesting to note that the 122 million acres of forest lands make up nearly 58 percent of the total land area of the lower South. This great forest is predominantly composed of young stands that have come in since the liquidation of the original forests; 77 percent of the forest area is classified as second growth. The original old-growth stands, some of which have been culled over, occupy only 15 percent of the forest area; and 8 percent of the area, while still forest land, is stripped of its forest cover.

FIG 2-FOREST AREA CLASSIFIED
ACCORDING TO FOREST TYPES

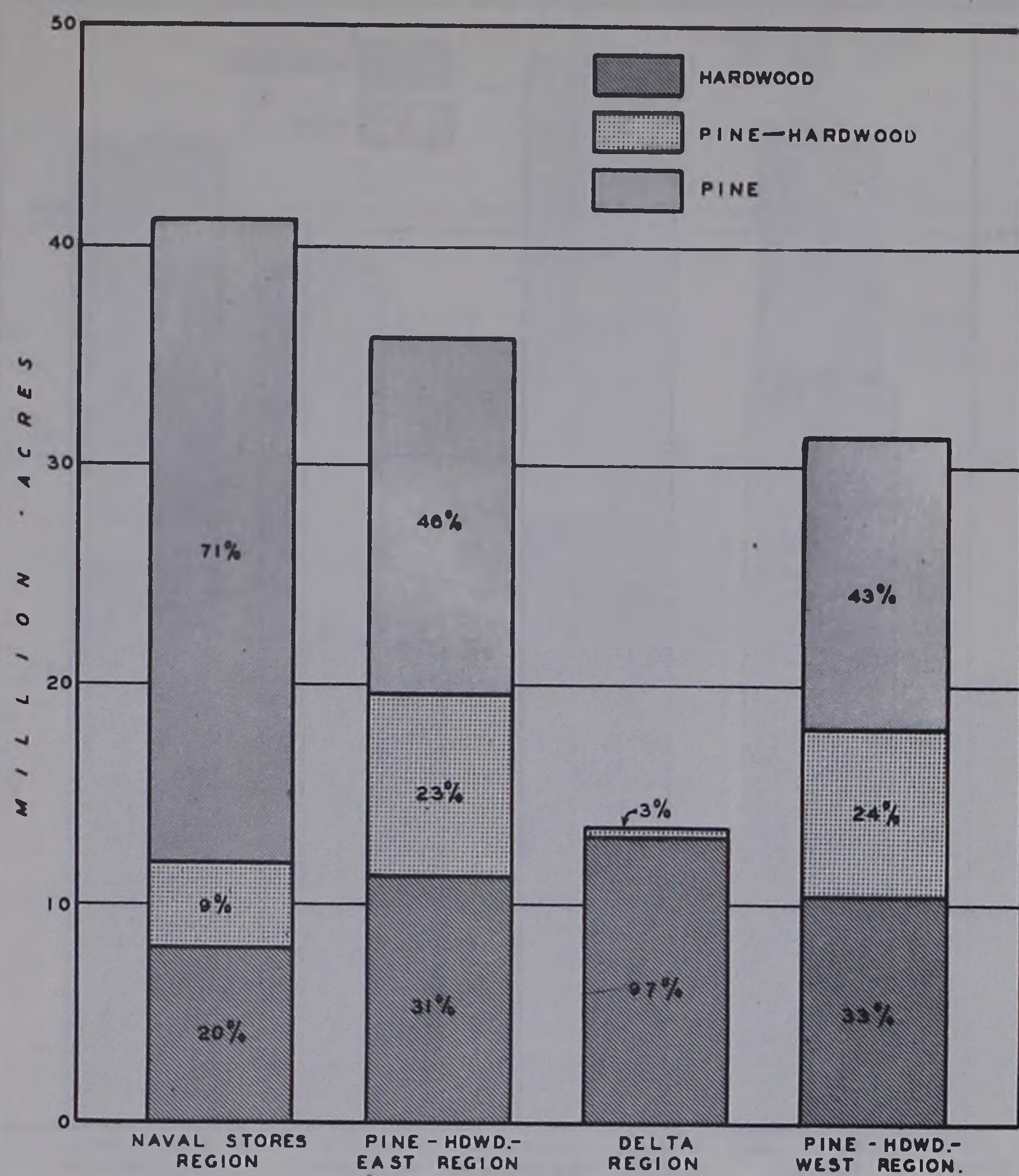
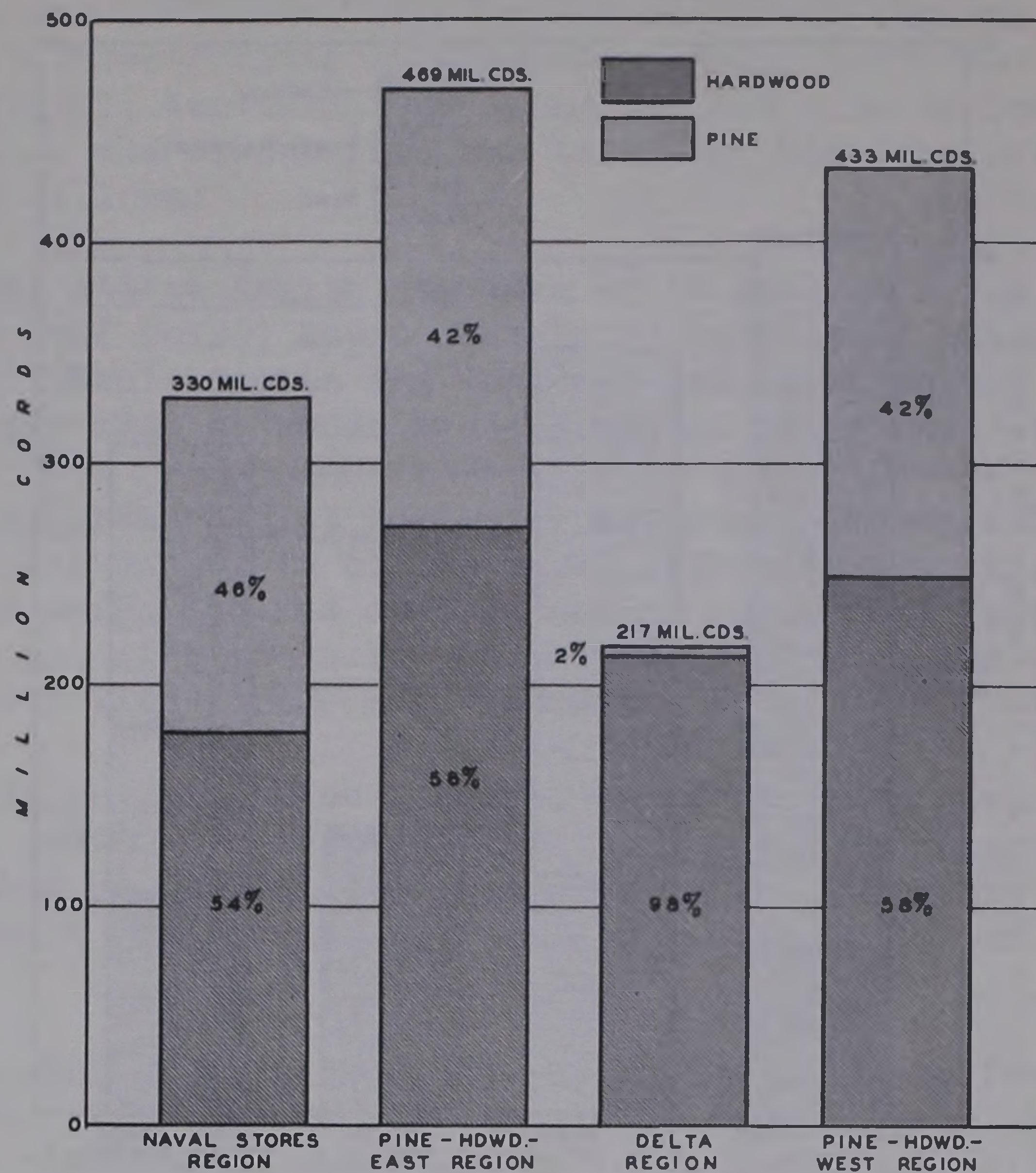


Figure 2 shows the classification of the forest area according to dominant forest types that characterize each of the four forest regions of the lower South. As may be seen from this chart, the areas occupied by pure hardwood and mixed pine and hardwood forest types make up 29 percent of the forest land in the Naval Stores Region, 54 percent in the Pine-Hardwood-East Region, 100 percent in the Delta Region, and 57 percent in the Pine-Hardwood-West Region. The two hardwood types occupy 51 percent of the entire forest region of the lower South.

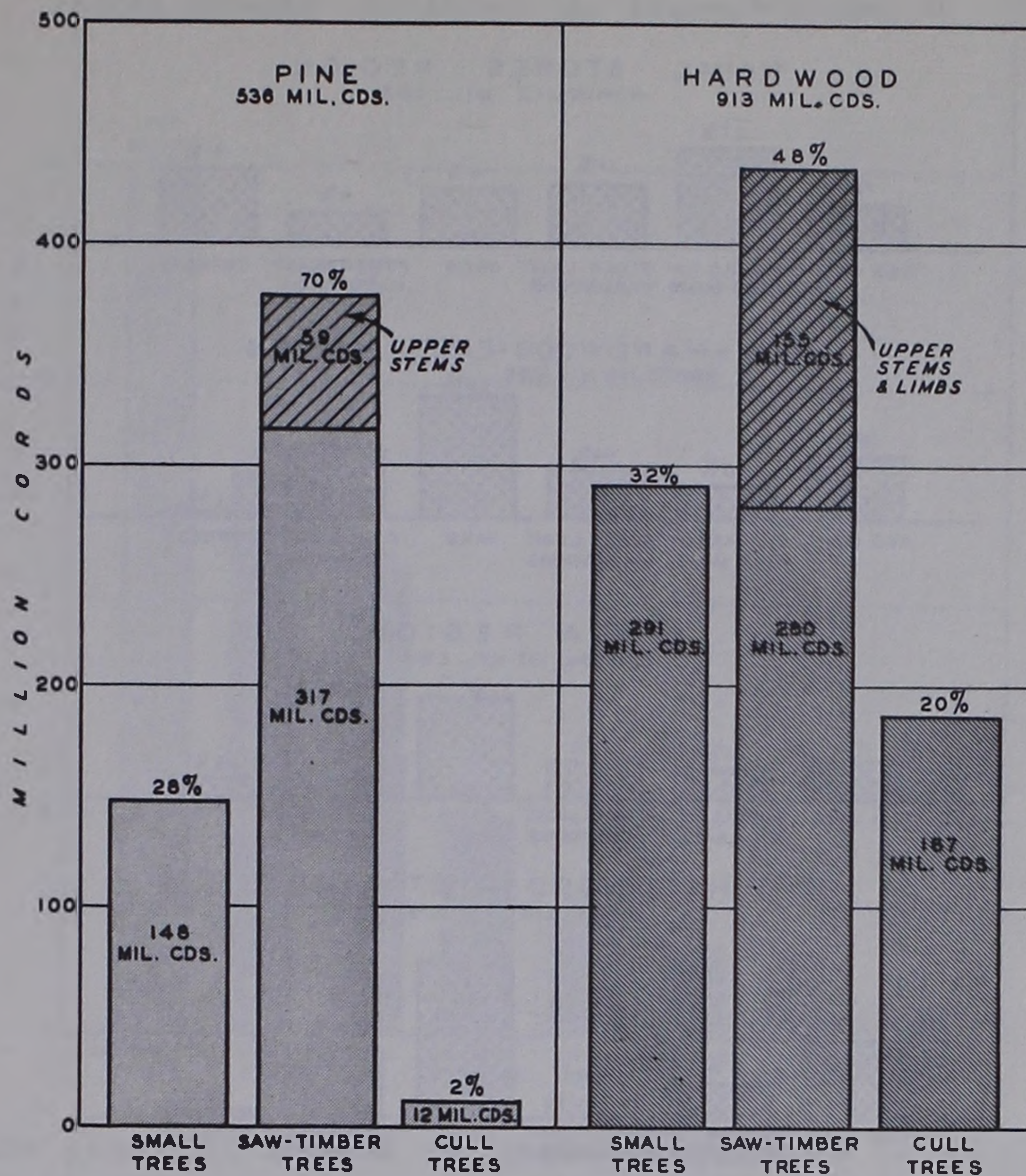
FIG. 3 - TOTAL VOLUME OF USABLE MATERIAL
INCLUDES SOUND & CULL TREES 5 INCHES & LARGER



The total volume of usable material in standing timber in the lower South is estimated by the Survey to be 1,449,000,000 cords. This volume includes the usable contents of all trees 5 inches d.b.h. and larger, including cull trees. The hardwood species contain 63 percent of the total usable volume. As indicated in figure 3, hardwoods make up 54 percent of the volume in the Naval Stores Region, 58 percent in the Pine-Hardwood-East Region, 98 percent in the Delta, and 58 percent in the Pine-Hardwood-West Region. The Pine-Hardwood-East Region contains the greatest quantity of wood volume, all species combined, and the greatest volume of hardwoods. It is interesting to note that the volume of hardwoods in the Mississippi Delta Region, which has long been famous for its great hardwood forests is exceeded by that in each of two other regions in the lower South.

Let us examine this timber volume from the standpoint of the size- or quality-classes into which it falls. As shown in figure 4, the Survey found the total pine volume to be 536 million cords. Of this, 28 percent is in small trees—trees in the 6 and 8 inch d.b.h.-classes. Generally, these trees are considered too small for lumber production. Seventy percent of the volume, including both lower and upper stems, is in saw-timber trees, i.e., trees 10 inches d.b.h. and larger. Cull trees, unfit for many industrial uses, contain 2 percent of the volume.

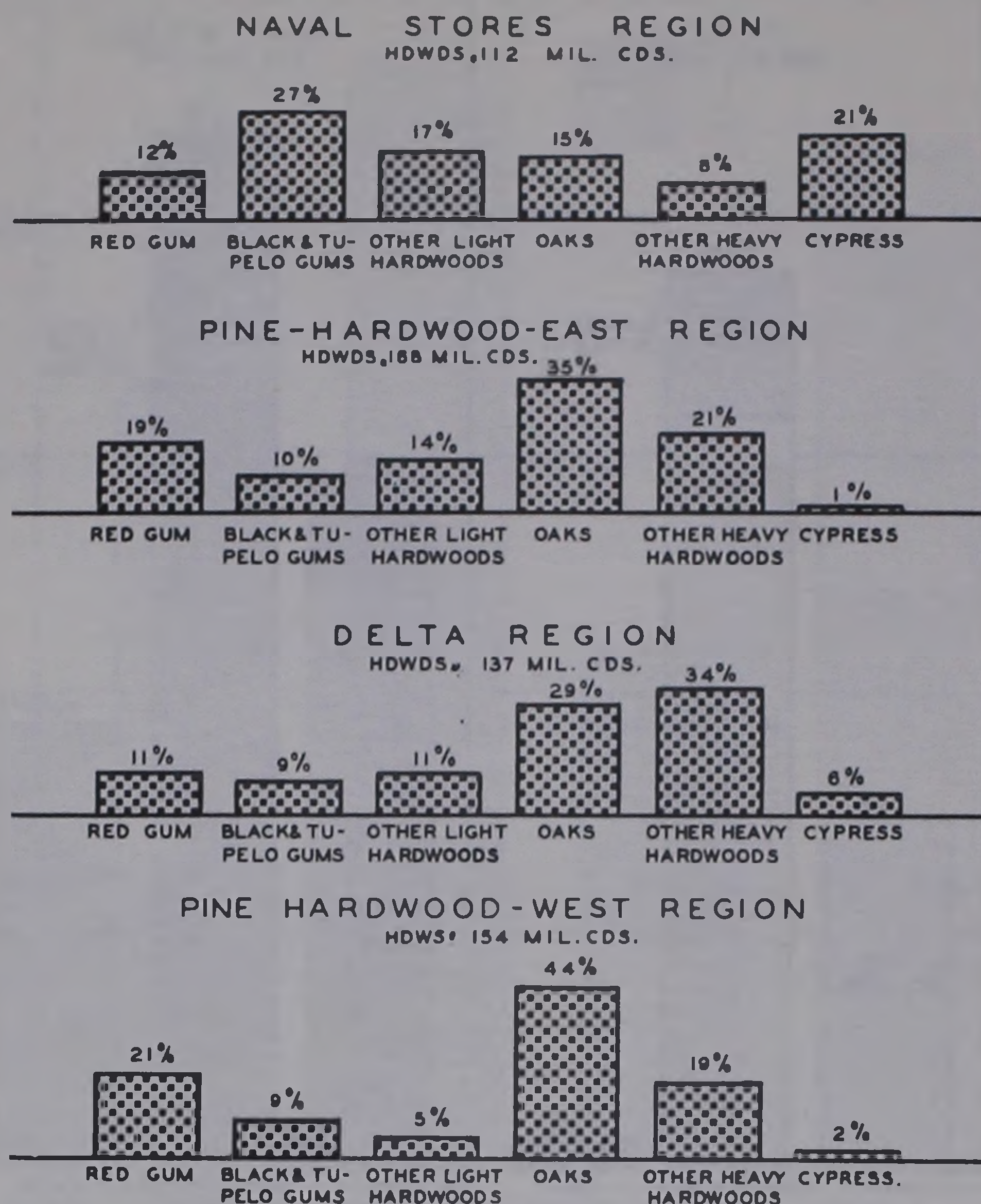
FIG. 4 - TOTAL VOLUME OF USABLE MATERIAL



There are 913 million cords of hardwood, of which 32 percent is in small trees (5 to 13 inches d.b.h.), 48 percent in saw-timber trees (14 inches d.b.h. and larger) with upper stems and limbs included, and 20 percent in cull trees unfit for lumber, veneer, and many other industrial uses. It should be noted that of the 913 million cords of hardwood there are 633 million cords in small trees, cull trees, and the upper stems and limbs of saw-timber trees. For this tremendous volume of wood there is at this time little or no industrial demand. Of course, a very considerable number of the small trees must be allowed to grow in order to perpetuate the forest stands and provide future hardwood timber.

The same hardwood species are found generally throughout the lower South but they occur in varying proportions in the four sub-regions. Figure 5 gives a cross-section of the hardwood growing stock in the several regions. As used here, "growing stock" does not include the volume in cull trees or in the tops and limbs of saw-timber trees; only sound trees are included. In the Naval Stores Region, the so-called light hardwoods, or woods generally considered as of pulping quality, make up (cypress included) 77 percent of the 112 million cords in the hardwood growing stock. The paper maker, however, is commencing to look upon the oaks and the other heavy hardwoods as potential sources of pulp. I have seen samples of good white paper made from overcup oak and from water hickory or bitter pecan.

FIG. 5 - PROPORTION OF VOLUME
IN SPECIES-GROUPS IN HARDWOOD GROWING STOCK

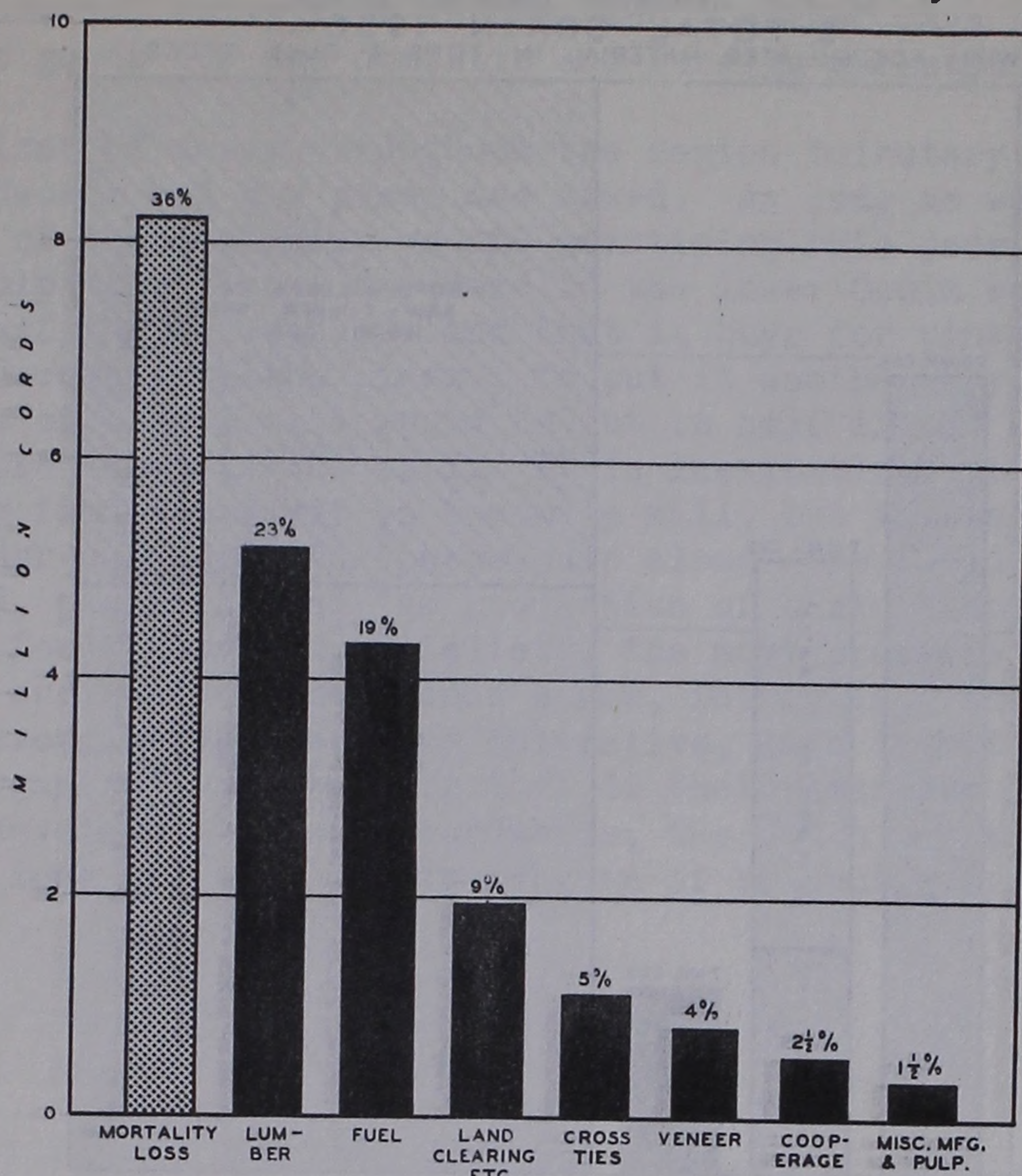


In the Pine-Hardwood-East Region, red gum, black gum, tupelo, and other light hardwoods, including cypress, make up 44 percent of the hardwood growing stock. In the Delta Region, the pulping hardwoods (cypress included) make up only 37 percent, and in the Pine-Hardwood-West Region, the pulping hardwoods with cypress also include 37 percent of the volume in the hardwood growing stock.

The lumberman of today treats a number of the hardwood species common to the lower South with some indifference. Several of the oaks and hickories, and a number of other species among both the light and heavy hardwoods, find no appreciable demand in the lumber market and perforce are left to stand as inferior species awaiting the development of new uses.

So far we have considered only the extent and volume of the forest resource of the lower South. In order to better understand the situation, however, it is necessary to consider the drain against this resource. From figure 6 we see that in 1936 the total drain against the hardwood growing stock from all causes and for all uses was $22\frac{1}{2}$ million cords.

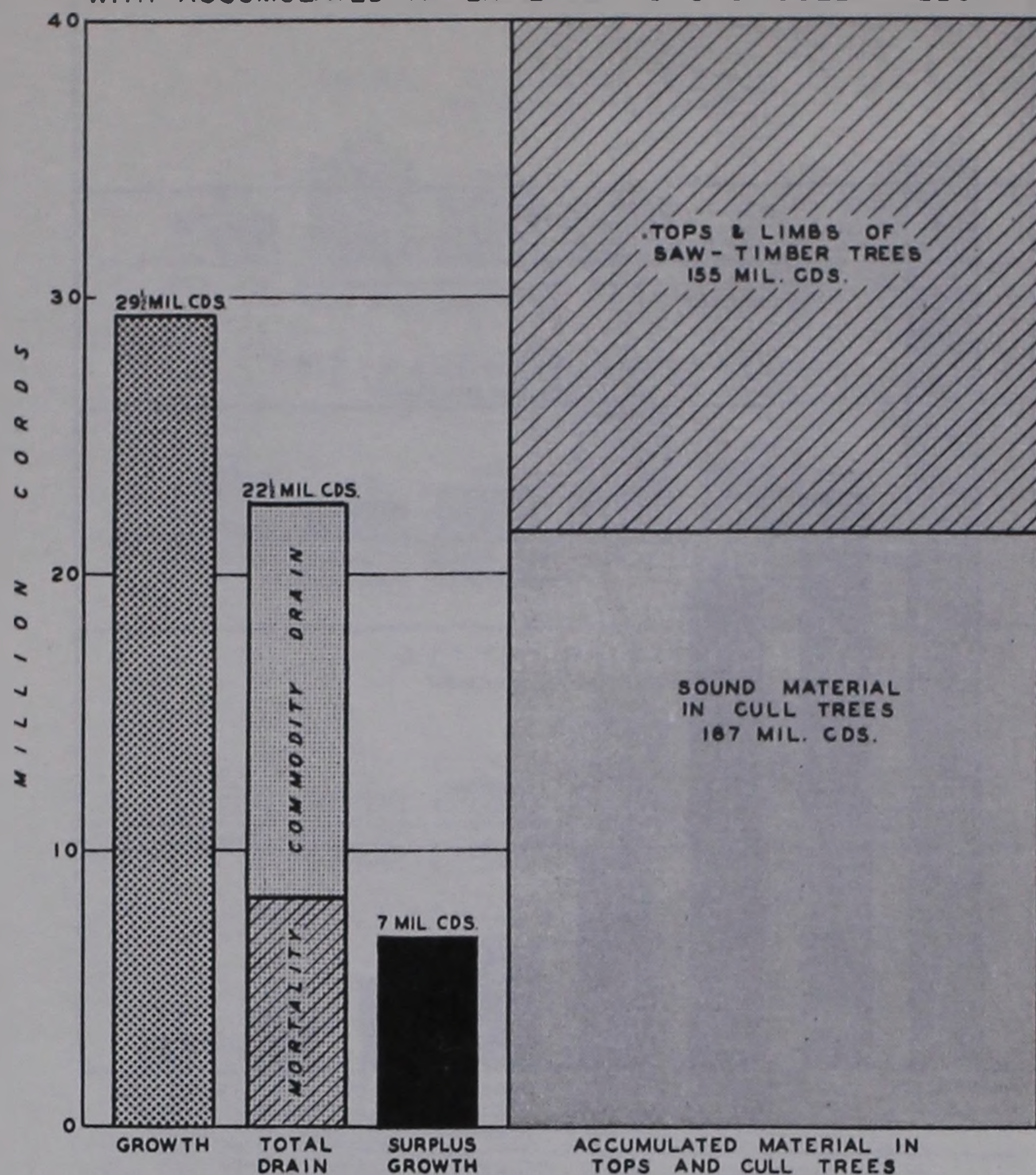
FIG. 6 - THE DRAIN AGAINST THE HARDWOODS, 1936.



By far the greatest source of drain, amounting to 36 percent of the total, was the loss due to mortality, a profitless consumption if there ever was one. The production of lumber caused 23 percent of the drain; fuel wood, 19 percent; land clearing and other farm use, 9 percent; cross ties, 5 percent; veneer, 4 percent; cooperage, 2½ percent; and all other uses, including pulpwood, 1½ percent. The mortality loss is primarily due to fire, insects, disease, wind-storms, and to over-crowding in dense young stands. A great part of it is preventable, and to the extent that better protection and wiser management reduces this annual loss, to that extent the sustained money-yielding possibilities of the region can be increased.

How does this drain compare with the current annual growth of the hardwood growing stock? In 1936, the sound-tree growing stock, no cull trees included, increased through growth to the extent of 29½ million cords. This growth exceeded mortality losses plus commodity drain by 7 million cords. Figure 7 shows the comparison of growth and drain, and in addition shows, on a comparable scale, the accumulated volume of material now to be found in cull trees and the tops and limbs of saw-timber trees and usable for pulpwood, fuel wood, chemical conversion, etc. It should be understood that the volume found in this category is not current production; it is the accumulation of years. Its removal from the forest would be of great benefit to the remaining stands, and its conversion into dollar returns on investment, into opportunity for labor, and in tonnage for transportation would be of tremendous benefit to the country as a whole and to the lower South in particular.

**FIG. 7-COMPARISON OF CURRENT GROWTH
OF THE HARDWOOD GROWING STOCK
& TOTAL DRAIN 1936
WITH ACCUMULATED MATERIAL IN TOPS & CULL TREES**



The big question is: "What can be done with this huge volume of hardwood?" The industrial hardwood-lumber business requires in the main a high proportion of fine-quality hardwood, such as is seldom found in either young or small trees. Until this industry changes its requirements and takes the species now considered as inferior and uses young trees of comparatively small size, it cannot be expected to use any very large part of the current annual increment, or any part at all of the accumulated volume of cull trees and the tops and limbs of saw-timber trees. The veneer and cooperage industries also require trees of higher than average quality, and are limited, in the case of cooperage at least, to a comparatively few of the many hardwood species. The pile and pole industry, at best, uses only trees that meet certain specifications as to form and quality and cannot be expected to use any part of the accumulated cull material. The railroad-tie industry uses a considerable amount of hardwood, but it is not likely to increase greatly its demand in the future.

All of the present day uses combined are not reducing appreciably the tremendous accumulation of sound usable material now in cull trees and in the tops and limbs of saw-timber trees amounting to 342 million cords, nor are they adjusted to the utilization of the saplings and small trees now needing removal from over-crowded stands. In addition to this mass of material, there is at the present time an annual increase in the growing stock of sound trees, over and above all drain, amounting to 7 million cords of wood.

Obviously, a new deal is needed for our hardwoods. The chemists and industrial engineers, particularly paper chemists, should take this huge mass of cheap raw material fully into account and consider ways and means of converting it into goods for the domestic and foreign markets.

On millions of acres throughout the region tributary to existing pulp mills, the hardwoods and the pines are mixed. As long as we pulp only the pine component of these stands, we are practicing both poor economy and poor forestry. A pulp mill almost anywhere in the lower South would have to buy perhaps only half the acreage of land that it buys for pine alone if it were to use the hardwoods with the pines. To put it another way, the average haul in the lifetime of a pulp mill would be cut in half if the hardwoods as well as the pines were taken to the mill. It is inevitable that southern hardwoods will eventually find their way to the pulp mill, but the industrial chemist will not consider hardwoods for paper pulp alone—the field is wide open for synthetic board, plastics, and the production of basic chemicals, textiles, and maybe even food. Our industrialists, the most progressive in the world today, have in our southern hardwoods a new, intriguing, and almost unlimited field for the exercise of that bold initiative, keen inventive genius, and facility for organized salesmanship that is their American heritage. In the technological development of its hardwoods, the South may take another step forward, and a long one too, in its program of balancing agriculture with industry.

Note: Assistance in the preparation of these materials was furnished by the personnel of Works Progress Administration Official Projects 701-3-9 and 365-64-3-7.